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THE YELLOW-WINGED LOCUST.

(*Camnula pellucida* Scudd.)

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For many years past the yellow-winged locust, *Camnula pellucida*, has been a pest of the greatest importance in certain agricultural sections of Idaho and Utah. Its injuries are so great that the natural development of these sections is seriously interfered with, and often crops are almost a total loss. This insect is quite generally distributed over the northern portion of the United States, but is injurious only in comparatively few localities in the West.

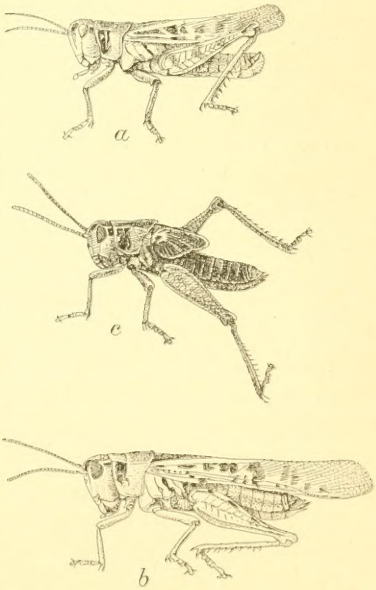

Fig. 1.—The yellow-winged locust (*Camnula pellucida*): *a*, adult male; *b*, female; *c*, nymph—somewhat enlarged. (Original.)

It is quite variable in color, ranging from light yellow to brown, with all gradations between. The males are always smaller than the females, and can be easily distinguished by the difference in the end of the abdomen, which is more or less rounded in the male, while in the female it ends with four horny points. The nymphs or young locusts are of a dark color, sometimes almost black. The young locusts depend entirely upon their legs for locomotion, as the wings in the earlier stages consist only of small pads.

The life history of this insect is not so well known as that of many other injurious species. The eggs are laid in the ground during August in pod-like sacs containing from 20 to 30 eggs each. The female usually chooses sandy or gravelly spots in which to deposit eggs. In the latter part of May and in June the eggs hatch, and in about a month the locusts become full grown and winged and begin to migrate, and if in sufficient numbers they strip the vegetation in their path. Many of them remain along the path of migra-

tion and deposit their eggs, and thus cause several years of abundance. In a few sections they are numerous enough to cause great damage only three or four years out of every ten.

This locust is a general feeder, and is especially destructive to hay, oats, and wheat, the principal crops grown in these sections. Apparently the insect dislikes alfalfa, as this crop is usually but little injured.

REMEDIAL MEASURES.

The application of remedial measures against this pest depends largely on the locality in which the pests are at work, and every possible advantage should be taken of the natural surroundings. The breeding grounds must be accurately located; and, if there are periods of years in which the insects are few in numbers and consist of scattering colonies, these colonies should be located and destroyed as a preventive measure. Many methods have been devised to combat the insect when it has reached the adult or winged stage, but at best these measures are very expensive, and are in most cases of little value. If success is to be obtained in the destruction or control of this insect, it must be attacked in its breeding grounds, either when it is in the egg stage or before becoming winged.

Plowing.—By observing the insects during the egg-laying period, or stirring the ground and exposing the eggs, the breeding grounds can be easily located. By plowing these grounds in the fall many of the eggs are buried so deep beneath the ground that when the young hatch in the following spring they perish because they can not reach the surface. Others are killed by exposure to the weather, and their numerous enemies have a better opportunity to feed upon them.

Spraying with oil.—In many sections of the West, where crude petroleum can be obtained at very little cost, the method of spraying with oil has been found very successful. The petroleum is sprayed over the breeding grounds upon the young locusts, which are killed by contact with the oil. The effectiveness of this treatment depends primarily upon the thoroughness with which it is applied. Additional effectiveness can be secured by burning over the ground after it has been sprayed, as this will kill those which have escaped the spray.

Hopperdozers.—Hopperdozers are long, shallow pans of any convenient dimensions, made of galvanized iron or other material mounted upon runners about an inch thick. The pan is partly filled with water, a small quantity of kerosene is added to form a film, and a screen is placed upright on the back to prevent the locusts from jumping over the pan. As hopperdozers are drawn over the ground by either men or horses, the young locusts jump into the air, fall into the pan, and are wetted and killed by the kerosene. This method has been found to be less effective against this insect than against locusts of other species. Sage brush in the breeding grounds often renders it difficult to use the

hopperdozers, and it is quite necessary to drive or sweep the young locusts of this species into the pan when it is drawn along, as but comparatively few of them jump high enough to fall into it.

Poisoning.—Poisoning the young locusts with arsenicals has been found to be one of the most effective measures that can be used against this insect. There are many mixtures which are very effective, but the greatest success has been obtained by a combination of arsenicals and fresh horse droppings. One pound of Paris green, or some other convenient arsenical, together with 2 pounds of salt, are thoroughly mixed with 60 pounds of fresh horse droppings. The resulting mixture is scattered among the young locusts or around the edges of fields which it is thought may be invaded. A very convenient receptacle in which to make this preparation is a half-barrel. A trowel or paddle can be used in scattering the mixture in the desired places.

The importance of beginning work against the younger stages can not be too strongly emphasized, because little can be done to destroy these locusts after they have wings and have begun their migrations by short flights. By means of a voluntary organization of farmers, a general survey of a locality in the fall, aided by the experience of previous years, will render it comparatively easy to forecast if the locusts will be abundant the ensuing season. During the years when they are few, a small amount of work will keep them within bounds, or by more extended work they may be nearly exterminated. Climatic conditions, parasites, and diseases, although often effective, can not be relied upon, and it is necessary that well directed and persistent campaigns be undertaken if success is to be obtained.

Approved:

JAMES WILSON,

Secretary of Agriculture.

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